

**THE AGREEMENT ON TRADE-RELATED ASPECTS OF  
INTELLECTUAL PROPERTY RIGHTS (TRIPs), ITS  
IMPLICATIONS AND DEVELOPING COUNTRIES**

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The intellectual property rights, covering software, layout designs of integrated circuits and breeders' rights, have gained an increasing importance since the 1980s. The TRIPs Agreement, which is one of the most significant outcomes of the Uruguay Round, provides for improved levels of protection for the rights of intellectual property owners. The proponents of the TRIPs assert that more efficient protection will induce R&D throughout the world and promote foreign direct investment and trade. The critics, on the other hand, argue that the TRIPs is heavily biased in favour of the monopoly rights of the intellectual property owners and will effectively restrict access to new scientific and technological knowledge. This paper broadly surveys the different approaches to intellectual property rights and to the TRIPs Agreement. It also aims at clarifying the probable implications of the Agreement with special reference to the developing countries.

**1. INTRODUCTION**

The treatment of intellectual property rights (IPRs) and technology transactions, together with world trade in services, foreign direct investment and labour migration, were issues not addressed by the rules of the GATT or the Bretton Woods institutions. The main international governing principles related to industrial patents, trademarks and copyrights prevailing in the 1950s were based on multilateral conventions such as "The Paris Convention for the Protection of Industrial Property" (1883) and "The Berne Convention for the Protection of Literary and Artistic Works" (1886).

It will not be incorrect to say that the developed countries were not very much interested in the protection of IPRs then, for two major reasons. First of all, the developed countries were the unchallenged exporters of manufactured goods and hence were not facing massive

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adjustment problems. Secondly, knowledge-based, high technology industries were virtually non-existent and therefore the diffusion of technology was not leading to radical alterations in the patterns of international competition.

During the last three decades, however, the developed countries made constant and increasing efforts aiming at the establishment of international rules and standards to provide protection to the IPRs. These efforts have culminated in the Patent Cooperation and Budapest Treaties for the protection of patents, Hague and Locarno Agreements regarding industrial designs, Madrid and Nice Agreements, the Madrid Protocol and Trademark Law Treaty on trademarks, Lisbon and Madrid Agreements on geographical indicators; Rome, Geneva, Brussels and Universal Copyright Conventions on literary and artistic property, UPOV on breeders' rights and the Washington Treaty on integrated circuits. With the exception of UPOV, those of the above-stated treaties which are in force are administered and supervised by the UN World Intellectual Property Organization (WIPO).

International agreements on IPRs were subscribed mostly by developed countries until the conclusion of the Uruguay Round. Developing countries generally and systematically ignored those agreements and preferred to rely on diffusion in obtaining foreign technology; copying, reverse engineering and the hiring of foreign experts being the main methods employed. Pharmaceuticals were the industry most often excluded from IPR protection in developing countries (Agosine et al., 1995).

Prior to the WTO Agreement on Trade-related Intellectual Property Rights (TRIPs) which entered into force in 1995, countries had IPRs regimes of their own, which were largely a matter of individual choice and subject to the principles and rules of the international conventions they preferred to join. The conventions that have been listed above did not provide any effective means for dispute settlements and required only national treatment for contracting parties. Preservation of national sovereignty and mutual recognition in the protection of IPRs formed the basis of the former international system (Mascus, 1996).

The 1980s witnessed a striking rise in international disputes over IPRs. During that decade, we also observe the US introducing a number

of new national legal and institutional measures in the field of intellectual property protection which include

- The 1980 amendment to the 1975 Copyright Act, granting copyright protection to software;
- The 1984 Semiconductor Chip Protection Act, which contains a crucial reciprocity clause;
- The 1985 International Software Protection Act, which also contains a reciprocity clause;
- The Omnibus Trade Act of 1988 that elevated the problem of weak foreign protection for US intellectual property (IP) to priority status for bilateral negotiations and potential trade retaliation (Vaitsos, 1990 and Maskus and Penubarti, 1995).

The IPRs proved to be an important issue in the establishment of the Single European Market in 1993 and in negotiations covering NAFTA. Many developed and developing countries were engaged in strengthening their IPRs regimes in the late 1980s and 1990s partly because of foreign pressure. During the Uruguay Round negotiations, the US and the leading industrial countries insisted that the Final Act should include an agreement on the protection of IPRs. It was claimed that strong IPRs protection was necessary to promote basic research and other cost-intensive activities and to encourage foreign direct investments (FDI).

The rising interest of developed countries in the strengthening of IPRs protection resulted from changes in the pattern of international trade, which took place in the 1970s and 1980s, the ensuing adjustment problems in the old industrial world and the dramatic growth of knowledge-based, high-tech industries. As the developing countries and particularly the NICs became significant producers and exporters of standardised manufactured goods, the old industrial world came to encounter massive adjustment problems. These problems were aggravated by the technological breakthroughs of the 1970s and the subsequent revolutionary impact on microelectronics and biotechnology which radically changed the environment. Computer programmes, plant varieties and biological inventions could be copied much more easily. This fact induced efforts seeking stronger IPRs protection (Vaitsos, 1990).

Pressures for systemic change in the IPRs regimes intensified and led to bilateral and regional, as well as multilateral (the GATT Uruguay

Round) negotiations on IPRs. “Departing from the assumptions that ideas are private property and that it is necessary to use some instrument permitting a certain degree of appropriability of the fruits of innovative efforts”, the Agreement on TRIPs “recognises as universally valid what is prescribed in international conventions administered under the auspices of the WIPO and, in some instances, goes well beyond their provisions” (Agosin, Tussie and Crespi, 1995, p.19). The Agreement’s scope is extensive and covers copyrights, industrial patents, trademarks, trade secrets, industrial designs of integrated circuits and geographical indications. This is not surprising. In 1986, more than 27 percent of US exports contained IP, that ratio was less than 10 when the GATT was negotiated (Fisch and Speyer, 1995).

The aim of this paper is to clarify the probable outcomes of the implementation of the TRIPs Agreement with special emphasis on the developing countries. In that context, the nature of intellectual property to be followed by the benefits and costs of a strongly protected IPRs regime will be discussed first. An analysis of the TRIPs agreement will follow. The following sections will be devoted to the analysis of the effects of the implementation of the TRIPs on trade, foreign direct investments, technological development and growth basically from the viewpoint of the developing countries.

## **2. INTELLECTUAL PROPERTY AND ITS REGULATION**

IPRs refer to creations of human intellect (intellectual property). They are legal expressions of privileges granted by the state for the use of creations. A unique feature of intellectual property is its inherent intangibility: “It relates to items of knowledge and to information which can eventually be incorporated or embodied in an unlimited number of copies of tangible things, machines, artifacts or goods, at the same time and in different geographical places all over the world. However, the relevant aspect is that the property is not in those tangible things, but in the knowledge and information embodied in them or associated with their production” (Bifani, 1990).

IPRs are composed of industrial property rights and copyrights. Industrial property rights refer to inventive solutions to technical problems which include the design and appearance of products and processes, whereas copyrights refer to either the exclusive privileges

granted to copies of artistic and literary works or to authorship and creativity. In the Anglo-Saxon tradition, copyrights refer to privileges granted to copies of works and in the continental tradition to privileges granted to authors or creators.

Economists have traditionally been more concerned with patents which aim to provide property rights to inventions. Rights to exploit inventions applicable to industry are awarded generally through patents, which provide the right to exclude other people or institutions from producing, selling or using the described product or process without authorisation for a fixed span of time. Since patents provide patent owners, exclusive property rights manufacturers wishing to use patented inventions are obliged to obtain authorisations or licences from patent owners by paying royalties. The granting of privileges under the patent system has been conditional on the disclosure of new technical knowledge, the rationale being to secure a reciprocity between the inventor who is granted protection and the society who is seeking benefit from the new knowledge obtained.

Since patents are intended to protect the embodiment of technical knowledge in products or processes, claims for them should meet technical criteria for novelty and industrial utility. Aside from the span of time, governments can place other limits on patents which include exclusions of certain subjects from patentability and measures against market abuses and monopolisation.

The subject matter of copyright protection encompasses original literary, scientific and artistic works regardless of the mode or form of expression. To enjoy copyright protection, the idea in the work needs not be new, but the form in which it is expressed should.

Trademarks are signs used to distinguish products of industrial or commercial enterprises from those of others and, hence, protect both the producer and the consumer. They may consist of distinctive names, words, letters, figures or colour combinations.

Industrial designs cover ornamental features of products including shapes, lines, motifs and colours. Consumer articles such as cars, textiles and leather products are examples of goods in which industrial designs are secured protection.

Geographical indications help inform the consumer about the quality, reputation or other characteristics of the goods which are attributable to its geographic origin.

Undisclosed information refers to trade secrets and know-how, which also benefit from protection. New technological developments have given rise to new forms of industrial property protection. One of these are the breeders' rights. They operate like patents and are provided to developers of new plant varieties. Layout designs of integrated circuits have also been regarded as intellectual property in the Washington Treaty negotiated in 1989 and again in the TRIPs Agreement and provided protection. They will be discussed in greater detail later.

The fact that protection of intellectual property (IP) is limited in time constitutes a second characteristic of the IPRs. Time-limited protection aims at the society's desire to balance private and social interests. A long period of protection leads to the abuse of temporary monopoly power, granted by the IPR, which increases the burden on the society. Therefore, the determination of optimal patent life has proved to be an important issue. For some economists, the optimal patent life should be determined according to the temporary monopoly power and the social benefits which are outcomes of the application of the new technology (Bifani, 1990).

The enforcement of any system of IPRs has two main functions: prevention of the infringement of rights and prevention of attempts by the rights holders to abuse those rights. Under most systems, it is the responsibility of interested parties to inform authorities concerned of such abuses or infringements. Actions against infringements and abuses include seizure of goods concerned at port, clamping down on unauthorised copying and distributing facilities and levying fines and criminal penalties (Maskus, 1998).

The effective enforcement of any IPRs system depends not only on the regulatory framework provided by the system, but also on the implementation of various economic and social policies. The industrial policy (including R&D and production subsidies), trade and investment policies, policies related to the environment and public health are the most important of them. Restrictive import and foreign investment policies generally increase the market power of patents and other IPRs and hence lead to abusive uses.

There is a wide difference between the IPRs systems of countries at different levels of development. A study by Maskus and Penubarti (1995) has revealed a strong positive relationship between the index of patent strength and real per capita income among other variables. Another regression suggests that patent protection declines in strength as economies move from the lowest to the middle income stage, which has been explained by the fact that relatively more developed middle income countries tend to focus R&D efforts on adaptation, imitation and reverse engineering (Primo Braga 1996, Maskus 1998).

Information developers of the developed countries point to the following primary shortcomings in the regimes of many developing countries:

- Inadequate copyright and trademark protection leading to widespread copying of entertainment and software products and unauthorised and misleading use of trademarks;
- Exclusion of pharmaceuticals, chemicals and food additives from patent protection;
- Non-existence of patent protection for biotechnological inventions and IPRs for plant varieties;
- Issuance of compulsory licences with inadequate compensation to firms that are perceived to be exercising their patent or trademark insufficiently to achieve desired consumer benefits or technology transfer;
- A weak and inadequately defined system of rules protecting trade secrets;
- Inadequate administrative and judicial procedures used in the enforcement of IPRs (Maskus, 1998).

### **3. CONTROVERSY OVER THE STRENGTH OF INTELLECTUAL PROPERTY RIGHTS**

The need for a strong system of IPRs has been defended on different grounds. First of all, there is the legal argument based on the concept of natural rights of human beings to own their intellectual products. The proponents of this argument assert that strong IPRs are the effective formal mechanisms which establish property in intellectual assets.

Economic arguments advanced in favour of strong IPRs are related to the concept of market failure. According to this argument, without

adequate protection, intellectual assets would suffer from overuse, since access to it will not be costly from the standpoint of its development and improvement. A special characteristic of technology is its imperfect appropriability. This characteristic enables people who have access to a newly-produced design to reproduce and use it free of cost. The fact that, generally, designs are implicitly contained in the products which emanate from them aggravates the imperfect appropriability of technology. Hence, the dissemination of information on the design begins to take place at the beginning of production. Free-riding behaviour which takes the form of imitation or reverse engineering will be very attractive under these conditions and, in turn, would lead to the imposition of dynamic costs of limited creation and product development and reduced growth on economies that fail to recognise it adequately (Agosin et al., 1995 and Maskus, 1998).

The public-good nature of information which facilitates free-riding through copying and the difficulty in assessing the social and private values of information constitute two peculiar characteristics of that intellectual asset.

It will not be wrong to say that the idea of enforcing strong IPRs to all forms of intellectual property is built around the assumption that the process of innovation depends on a system of incentives and that IPRs, as a decisive factor of incentive, play an important role in the adjustment process (Fisch and Speyer, 1995). Patent systems have been instruments for fostering technological innovation in most industrialised countries since the 19<sup>th</sup> Century. “The prospect of supernormal profits in a temporary monopoly protected against illicit imitation is meant to encourage companies and investors to increased investment in the research and development of new product and processing methods” (Zeeb, 1996). Proponents of this view assert that, to provide a socially necessary incentive for innovators and entrepreneurs, the state has to support an adequate return on research and development costs by establishing and enforcing temporary monopolies for inventors. The monopoly rents obtained by the innovators, plus the costs incurred by the state, constitute the price of technological progress to the society (Van Grastek Communications, 1990). According to a writer, “patents explicitly prevent the diffusion of new technology, to guarantee the existence of technology to diffuse in the future” (Benko, 1987).



Economists who oppose strong IPRs systems, on the other hand, base their arguments on static and dynamic social losses associated with such systems. Static social losses are associated with the monopoly power granted to the intellectual property owner. Dynamic social losses are basically concerned with the effects of IPRs on the dimension, speed and direction of technological progress.

Static social losses take two forms. The first concerns the “IP producing country”, the second the “IP importing country”. With respect to the former, the following allegations are made:

- Strong IPRs lead to patent races and hence to costly duplication of investment in R&D;
- Strong protection also encourages efforts to assert IP ownership rights, to extend them for as long as possible to reap the fruits of a monopolistic position;
- Trying to exclude potential free riders may give rise to high enforcement costs;
- Since the marginal cost of provision is small, exclusion of prospective users may impose static dead-weight costs;
- Costs of transferring rights to IP may significantly rise as a result of contracting difficulties related to uncertainty about the value of information and problems in monitoring (Maskus, 1998).

The second form of static losses (those that concern the IP importing country) can be summarised as follows:

- The abuse of the monopoly power of foreign patentees as an instrument to penetrate domestic markets and raise barriers to the entry of competitive firms;
- The usage of IPRs as an instrument to reserve markets for goods imported from the home country;
- The use of IPRs for overpricing and transfer pricing (Bifani, 1990).

Economists who base their arguments against strong IPRs generally regard technological change as a strategic element of the rate of economic growth, a crucial factor which determines the competitiveness of firms, their size and growth. The rate of technological change is

considered to be determined by expenditures on R&D and the rate of technological diffusion. In fact, many studies have revealed that the rate of return on R&D is high, and is much higher than the rate of return on investment in structures, machines and equipment (Coe, Helpman and Hoffmaister, 1997). In a study conducted by Coe and Helpman who used a sample of 21 OECD countries and Israel, the long-run average rate of return on R&D investment in the 6-7 economies proved to be 120% and an additional 30% accrued to the other 15 countries in the sample (Coe and Helpman, 1995).

Knowledge, besides being a final product, is also a fundamental input which can be cumulated. These features, together with its diffusion possibilities, are at the origin of important spillovers associated with investment in R&D activities. As a result, investment in R&D has increasing returns to scale in the production of new knowledge (Bifani, 1990). Economists who criticise strong IPRs, assert that leading technology giants strive to reinforce existing appropriability regimes in order to keep appropriated technological innovations in larger areas of the world for a longer time, and also to capture the maximum rent, whereas late industrialising countries try to enhance diffusion mechanisms of existing IPRs.

Dynamic social losses generated by strong IPRs stem from the two peculiar characteristics of technology: The fact that it is incompletely specified and is imperfectly transferable to other environments and that its transfer conveys strong informational asymmetries. The latter characteristic enables the seller to segment the information as much as possible so as to discriminate against the buyer. Altogether, these characteristics slow down the diffusion of technology (Agosin et al., 1995).

The disadvantages of patenting and of enforcing strong IPRs regimes for developing countries can be summarised as follows:

- Developing countries seriously lag behind on the technological frontier. The technology they need has a strong public component. Existing informational asymmetries may, however, inhibit the free usage of certain technologies by local entrepreneurs even if technologies are in the public

domain and may sometimes oblige the entrepreneurs to pay royalties, even when they do not need to do so.

- Although some recent studies have revealed a relationship between strong IPRs and FDI in developing countries, these findings are far from being general and convincing.
- Stringent protection of intellectual property rights will obstruct imitation and, hence, technological development.
- The enforcement of strong intellectual rights protection is likely to: (i) result in an increase in imported goods that were formerly produced domestically through reverse engineering or imitation, (ii) increase royalties to be paid, (iii) lead to a rise in the profits of foreign companies producing patented goods, since they will be able to sell those goods at higher prices (Agosin et al., 1995).

#### **4. MAIN CHARACTERISTICS OF THE TRIPs AGREEMENT**

The Agreement on Trade-related Aspects of Intellectual Property Rights, Including Trade in Counterfeit Goods (TRIPs Agreement) contains obligations which go far beyond what had been envisaged at the outset of the Uruguay Round negotiations. This fact has been an outcome of the insistent efforts of the USA and other major developed countries. The position of the USA was set out clearly by the US Trade Representative in the following words “Our present negotiations on trade-related aspects of intellectual property rights are one of our top priorities. Success in those negotiations is essential to the successful conclusion of the Round” (Bifani, 1990).

The TRIPs Agreement recognises as universally valid what is prescribed in the Berne, Paris and Rome Conventions on IPR protection. It also integrates the existing systems of IP protection which are mainly under the WIPO and complements them on areas where there appears to be no consensus. With the TRIPs, essential provisions of old conventions governing intellectual property protection under WIPO auspices have acquired a binding feature, they have been made universally applicable on a most-favoured-nation (MFN) basis and through the WTO Agreement, with its dispute settlement mechanism, have been integrated to the multilateral trading system.

One of the most striking features of the TRIPs Agreement is the call for the harmonisation of different national rules on IP protection. “The TRIPs accord commits developing countries in the WTO to significant IPRs protection, albeit with a long phase-in period for the poorest countries and thereby brings about a substantive harmonisation in international standards. This accord is an important accomplishment for intellectual property interests in the technology-exporting nations and a substantial ‘concession’ (in GATT terms) by the poor countries” (Maskus, 1997).

The Agreement contains general obligations concerning national treatment, MFN and transparency. Article 3 stipulates that with respect to the “availability, acquisition, scope, maintenance and enforcement” of IPRs, foreign nationals will not be accorded treatment less favourable than that accorded by a country to its citizens. Article 4 requires extension of MFN treatment to foreign nationals in a non-discriminatory fashion. Reciprocity exemptions exist for copyrights, for advantages acquired or immunity accorded by members through international agreements or conventions on IP.

IPRs covered by the TRIPs Agreement include copyrights, industrial patents, trademarks, trade secrets, industrial designs, layout designs of integrated circuits and geographical indicators.

In relation to copyrights, the period of protection is 50 years from the date of authorised publication or life of the author, plus 50 years. For cinematographic work it is 50 years after the work has been made available to the public, for photographic work it is 25 years and for performers and producers of phonograms it is 50 and for broadcasting it is 20 years. The Agreement provides that data compilations and computer programmes should be considered literary works and protected under national copyright laws for 50 years (Articles 9-14).

Trademarks are provided protection of 7 years from initial registration and each renewal of registration which can go on indefinitely (Article 18). The Agreement deters use of collateral restrictions to invalidate marks and also use of confusing marks and speculative legislation (Articles 12 and 11). Industrial designs are also provided a minimum protection of 10 years (Article 26).

Industrial patents are regarded as intellectual property rights, protecting both the idea of the creator and the mode of its expression. Articles 27-34 of the TRIPs Agreement are on patents: It is accepted that any innovation, fulfilling the conditions of novelty, innovative effort and concrete application, is patentable. Such innovations include micro-organisms and microbiological processes needed for the creation of animals and plants, but excludes biological or natural processes. Patent holders are obliged to disclose the information contained in the innovation.

Severe restrictions are put on compulsory licensing by Article 31 which states that access to patents cannot be made conditional on using it in domestic protection. This goes beyond what is recognised in international conventions. By virtue of Article 28 the patent holder is also given the exclusive right of importation. The Agreement contains various safeguard provisions from the viewpoint of technology importers but “how far they can be taken is a matter of some debate” (Weston, 1995). For example, compulsory licensing may be used on grounds of protecting the public interest, in cases of extreme emergency, of non-commercial public utilisation, of excessive pricing, of unreasonable terms of licensing terms (Article 31). The time limit of patent protection will be 20 years.

With respect to integrated circuits designs, the Agreement extends protection to articles that incorporate infringed design for a minimum of 10 years (Article 38). Integrated circuits consist of electronic components incorporated in solid substrata, etched with a circuit layout or layout design. The latter is basically a programme which enables the organisation, control and storage of information. Its creation is expensive and cumbersome, although it involves little innovation. Since neither miniaturisation of existing known circuits or the recombination of circuit elements of other existing chips is eligible for patenting, they have been excluded from patents (Bifani, 1990).

Trade secrets are protected against unfair disclosure methods under Article 39. Article 40 is concerned with the control of competitive abuses and stipulates that a member may adopt, consistently with the other provisions of the Agreement, appropriate measures to control such practices.

Articles 42-61 are devoted to the enforcement of IPRs. Enforcement measures require civil and criminal measures and border enforcement. The TRIPs Agreement prescribes the institutional mechanism, procedures and remedies that countries are expected to adopt to (i) enable IPR holders to obtain redress under civil law, (ii) prevent release by customs authorities of counterfeit, pirated and other goods which infringe IPRs, and (iii) for the prosecution of counterfeiters and pirates under criminal law (ITC and CS, 1996). The enforcement of the Agreement will be costly for developing countries and will place new burdens on their balance of payments through increases in imports, in royalty payments and in prices of patented products. Two types of compensation will be supplied to the developing countries: (i) financial and technical assistance in the creation of legislation and necessary institutions for enforcing the new rules on IPRs protection, (ii) provision of incentives to the enterprises and institutions of developed countries to transfer technology to the least developed countries (Article 67). The details, such as the terms and amounts of financial aid, its relationship to other existing aid programmes, however, have not been specified.

Member countries have been given by the TRIPs Agreement transitional periods during which they are obliged to bring their legislation and regulations in conformity with the provisions of the Agreement. The transitional period for developed countries ended on 1 January 1996. It ends on 1 January 2000 for developing countries and transitional (i.e., formerly centrally planned) economies. For least developed countries, it ends on 1 January 2006. (Articles 65-66).

The developing countries are also given the right to continue providing patent protection to processes, but not to products. In the food, chemical and pharmaceutical sectors, they are allowed to delay the application of obligatory protection to products until 1 January 2005. Member countries are required not to take any measures that will result in a lower level of protection during transitional periods.

Article 64 of the Agreement puts forth dispute settlement procedures. Since the Agreement is an integral part of the WTO, which aims at implementing an integrated dispute settlement mechanism, "cross retaliation" between non-compliance in this area and market access in goods will now become legitimate. With respect to litigation procedures, the burden of proof is reversed. Proving rights devolves on

the accused infringer rather than on the holder. This no doubt tightens concessions to developed country interests (Agosin et al., 1995). A five-year moratorium on the use of dispute settlement against indirect violations of the TRIPs Agreement has, however, been provided, allowing nations to select implementation strategies.

A monitoring body (the Council for TRIPs) that is in charge with the application of new rules and norms has been created by the Agreement (Article 68).

“The TRIPs Agreement basically provides for upward harmonisation of national legislation, with regard to IP protection towards the standards prevailing in the developed countries and obliges developing countries to change their existing patent laws (Agosin et al., 1995).

The TRIPs agreement necessitates radical changes in the IP regimes of many developing countries which can be summarised as:

- The need to extend patent protection in due time to products like pharmaceuticals and chemicals that have been excluded from protection temporarily under national laws.
- Modifications which secure terms of patent protection shorter than the 20 years indicated in the Agreement.
- Extension of copyright protection to computer programmes as literary works.
- The adoption of a specific system for the protection of plant varieties or the protection of those varieties by patents (or a combination of both).

In addition to Articles giving transitional periods within which developing countries are obliged to bring their national legislation and regulations in conformity with the TRIPs Agreement and to references in the Agreement to technical assistance and incentives regarding transfer of technology, there are a number of other provisions which seem designed to respond to the particular interests of those countries (Weston, 1995). They are comprised of:

- Article 8 which allows members to adopt measures necessary to protect public health and nutrition, to promote public interest in

vitally important sectors and for socio-economic and technological development;

- Article 27 which excludes various products and methods from patentability on the basis of human health or serious prejudice to the environment;
- Article 31 which is related to compulsory licensing has been referred to before in this paper;
- Article 40 which states that all members are committed to help each other with investigations of anti-competitive practices;
- Article 48 which requires the defendant's legal costs to be paid by the applicant when a case has been proven to be brought on frivolous grounds.

There will be short and long run costs incurred by developing countries from the application of the TRIPs Agreement, which to a large extent will depend on the implementation of the Agreement after 2000. "It is to be expected that countries will be active in challenging measures under the dispute settlement mechanism in order to "test" the scope of obligations" (UNCTAD, 1994).

## **5. ECONOMIC IMPLICATIONS OF THE TRIPs AGREEMENT AND THE DEVELOPING COUNTRIES**

The TRIPs Agreement imposes considerably stringent limitations upon the developing countries by strengthening minimum protection standards, initiating harmonisation of IP systems and subjugating disputes in IP to the integrated dispute settlement mechanism of the WTO. "It also expands the choice sets available for high-technology firms in deciding how best to service international markets through interfirm or intra-firm trade, investment, joint ventures, licensing, patent pooling or cross-licensing agreement with competing foreign firms, and pricing to markets" (Maskus, 1998). In very general terms the TRIPs Agreement will have significant effects on (a) technological innovation and its diffusion, and (b) on international trade and investment flows.

### **A. Effects on Technological Innovation and Diffusion**

Technology, which for a long time has been considered one of the most important factors for economic development, has now become the



strategic element in creating comparative advantage and acquiring competitiveness in world markets (Ricupero, 1990). In a world where technological progress is basically endogenous and the distribution of technical knowledge is a major determinant of international trade patterns, we can say that it is the prospect of supernormal profits resulting from innovation which induces firms to conduct research activities. “The efficiency of technological development is greatly enhanced by the competitive pressures and the constant threat of losing monopoly. Stronger--international--competition does not, however, necessarily and always translate into technological progress and welfare gains for all. On the contrary, stronger competition may well impede the dynamics of technological progress, if the amount of supernormal (“pioneer”) profits accruing to the innovator is insufficient” (Fisch and Speyer, 1995).

Consequently, the costs for the domination of leading-edge technologies and a continued flow of innovation have become main elements of economic policies designed by the major developed countries. Between 1980 and 1996, the Gross Domestic Expenditure on R&D, which is considered to be the major factor behind technological progress, has increased by 60 percent in the EU, 57 percent in the US and 118 percent in Japan (EC, 1997, Statistical Annex, 5-8). The State in major technology-generating countries has provided state subsidies to support new technologies. Government-funded research consortia became an instrument of national technology policies. The Sematech programme in the US, the European JESSI or ESPRIT and the VLSI project in Japan provide the main examples to those efforts. All of them were closed to foreign companies and even their subsidiary firms.

The number of patent applications increased from 21.384 to 28.635 in the EU; from 1.625 to 1.882 in EFTA, from 11.614 to 20.308 in the US and from 6.619 to 7.941 in Japan between 1985 and 1994 (EC, 1997, Statistical Annex 60).

The rapid diffusion of newly-generated technologies through copying and imitation has led the developed countries to resort to different and somewhat odd methods of preventing the diffusion process. For example, physical masking techniques such as “software programming traps, copy-protect schemes, the encryption of important

codes, and the use of special materials to make copying more difficult”, (Taylor, 1993) have been extensively used to prevent reverse engineering and copying efforts.

Another method has been the discriminatory protection based on Section 337 of the US trade laws, which provide different levels of protection depending on the location of the firm. When the infringing product was domestically produced, the IP holder sought protection in the US district court; when it was of foreign origin, the IP holder could seek redress either through a civil action in federal district court or through an administrative proceeding before the ITC. “Between 1975 and 1988, IP plaintiffs won 65 percent of the time at the ITC as compared with 40-45 percent in district courts” (Aoki and Prusa, 1993).

Inducement of technical innovation at the global scale and enhancement of its diffusion are the long-run benefits commonly associated with the TRIPs Agreement by its proponents. Empirical evidence, however, suggests that the complicated nature of innovation and diffusion prevents us from reaching the above-stated conclusions.

First of all, since copying of unpatented products is the core of the pharmaceutical industries in many developing countries and imitation the most important form of diffusion in many markets, the potential effect of TRIPs will be the removal of a major channel of technology transfer. The assertion that stronger spillover impacts into local productivity emanating from the patenting process may be used for follow-on invention on an extensive scale (Eaton and Kortum, 1996) is debatable. Stronger gains in productivity emerging through the imports of capital goods and technical inputs embodying advanced knowledge (Coe et al., 1998) seems to be a more significant outcome.

A stronger global protection of copyrights also seems unlikely to lead to a substantial rise in literary and artistic production. “Similarly, better protected trademarks in developing countries seem unlikely to expand incentives for product and brand development in the developed countries” (Maskus, 1998).

Surveys have indicated that a strong relationship exists between patents and inventive activity in automotive equipment, instruments and

pharmaceuticals (Levine et al., 1987). The implementation of the TRIPs Agreement should induce some technological development in those fields as well as in biotechnology. The implementation of the same Agreement is likely to lead to an increase in the number of patents registered in developing countries. Since the Agreement calls on members to enforce provisions requiring patent applicants to disclose the technical information, access to such information may induce industrial enterprises to use it for further R&D to develop processes or products that differ from the patented ones (ITC-CS, 1996). This, however, is likely to take place only in newly industrialising countries that possess sufficient qualified technical personnel.

Increased protection of IPRs is also expected to enhance attempts by companies in developing countries to enter into joint ventures and other forms of arrangements aiming at the transfer of technology on commercial terms. It is also asserted that in plant varieties and basic biotechnological inventions, the TRIPs Agreement will promote technological development and induce new research into the product and technical needs of developing countries. Accordingly, firms engaged in R&D activities for purposes of imitating products should find opportunities for shifting into small-scale innovation for local markets (Maskus, 1998). In resource-abundant countries the privatisation of agricultural research may also expand and breeders' rights be taken under protection (Primo Braga, 1996).

The patenting of biotechnological innovations, on the other hand, will significantly reduce possibilities for imitation and increase the costs of agricultural production. Types of seeds may come to be patented by international agribusiness so that small farmers may have to buy new seeds every year, instead of re-using their own seeds (Naqvi, 1994).

In order to eliminate the adverse effects of IP protection on agricultural production costs, the developing countries must take advantage of being the biomass reservoirs of the world. If they carry out biological censuses, build germoplasm banks and set up strong measures of border vigilance, they will be in a position to gain control over their resources and enabled to sell exploitation rights to their biomass. Since innovations are almost exclusively contained in the products, reverse engineering possibilities also exist in that field (Agosin et al., 1995).

The rules on biotechnology and plant varieties will be of particular concern to the agricultural commodity exporters and farmers of least developed countries. The other major concern will be the rise in drug costs, resulting from enhanced protection of IP and the termination of compulsory licensing.

On balance, it is difficult to say that over the medium and long term the stronger IP protection envisaged in the TRIPs Agreement will have a positive effect on the development of the inventive process in the majority of developing countries. The present scarcity of human capital and the underdeveloped nature of existing scientific and technological capacities seriously preclude developing countries from stimulating scientific research and R&D activities. The sole adoption of legislation favouring strong protection of IPRs is more likely to obscure imitation and retard technological development.

It should not, however, be forgotten that imitation possibilities cannot be completely eliminated by patent systems, but can only be reduced. To the extent that developing countries exclude from their patenting legislation innovation that is minor and routine, and from their copyright legislation general scientific principles, they will be provided with a sufficient margin where they can practise reverse engineering, engage in processes of adaptation or improvement of existing technology. Countries like Japan, whose legislation on patenting has a considerably limited scope and makes exhaustive use of exceptions, have permitted extensive reverse engineering for purposes of research, which, in turn, have found their ways to the private sector through spillovers (Agosin et al., 1995).

The sensitivity of product and technology licensing to IPRs is another factor that will be affected by the implementation of the TRIPs Agreement. It is asserted that the above-stated sensitivity is strong for three reasons. First, stronger IPRs lower licensor's expense of deterring defection from contracts and thus reduce costs of licensing. Second, they are expected to expand security over the protection of proprietary information in licensing deals. Third, they enable the licensor to set and monitor terms of operation for licensees (Maskus, 1998). It should, however, be borne in mind that the promotion of transferring technology through licensing will not result in a remarkable fall in costs due to the fact that the high cost of licensing is mainly an outcome of aspects of

technology tied up in a firm's technical know-how management skills, administrative structure and qualified personnel.

### **B. Effects on Trade and Foreign Direct Investment**

The relation between trade and IPRs is an important issue that has been investigated by economists, especially during the 1990s (Grossman and Helpman, 1991; Helpman, 1993; Taylor, 1994). It is generally accepted that variations in international patent laws, through their effect on returns to innovation, induce innovation and growth. The decision to trade in other markets is the primary channel in that process (Maskus and Penubarti, 1995).

It is an option for the exporting firms to base their decisions regarding trade partly on the strength of local IP protection. Such firms, however, face a trade-off between the market power generated by strong patents and the larger effective market size created by reduced abilities of local firms to imitate the product (Maskus and Penubarti, 1995). An empirical model, specified by Maskus and Penubarti, in which deviations of bilateral sectoral imports from anticipated levels are related to income, trade barriers and patent laws and where patent regulations in the importing country are corrected for endogeneity through the use of instrumental variables, has yielded interesting results. The results of the final equations have revealed that strengthening of patent protection has a positive although small impact on bilateral manufacturing imports into developing countries. This effect is stronger in large developing countries with significant imitative capabilities (Maskus and Penubarti, 1995).

Another study has presented empirical evidence on the fact that total factor productivity in developing countries is positively and significantly related to R&D in their developed country trade partners and to their imports of capital goods from the developed countries (Coe et al., 1997). Numerous studies, however, also indicate that human capital is an important factor which allows a country to take better advantage of technological advances in its trade partners.

The TRIPs Agreement, through the enforcement of its various provisions, is expected to control the production and trade of counterfeit

and pirated goods. Actually, prevention of the trade in counterfeit goods was a request which gained the support of developing countries during the Uruguay Round.

Trade in counterfeit goods stems mainly from the fact that small and medium enterprises (SMEs) are not fully aware of the legal implications of using unauthorised trademarks. Counterfeiting injures the export activities of small domestic producers working under licence for foreign manufacturers. Developed-country manufacturers marketing products under their brand names but producing the product itself or parts of it in developing countries in order to take advantage of low production costs, seem more willing to enter into arrangements with countries that effectively protect IPRs (ITC and CS, 1996).

The upward harmonisation of IP legislation has often been advocated on the grounds that it will induce foreign direct investment (FDI). In theory, however, incentives for FDI arising from stronger IPRs are ambiguous. If we accept that as long as foreign trade and FDI are substitutes, stronger IPRs result in an expansion of trade and we should expect the FDI to decline following the enforcement of stronger protectionist regimes.

Empirical evidence, however, suggests that in products in which knowledge-based assets give rise to investment, there is a complementarity between trade and FDI. The spectacular growth witnessed in intra-firm trade provides sufficient evidence for this fact. "By directly raising the economic value of ownership advantages, stronger patents, trademarks and trade secrets should expand the profitability of FDI, particularly in conjunction with expanded market demand as imitators are discouraged" (Maskus, 1998). On the other hand, since strong IPRs reduce contracting costs in licensing, a substitution effect into licensing should also be expected.

The results of Mansfield's survey has revealed that in software and pharmaceuticals, together with investments in local R&D facilities, there is a stronger relationship between IP protection and investment (Mansfield, 1994). In general, IPRs have a more remarkable effect on FDI in higher-technology products.

Outward and production-oriented FDI in relatively high technology activities takes place in three major cases. The first involves market

penetration (e.g., through foreign-owned subsidiaries or joint ventures abroad so as to qualify for 'national treatment' and, thus, secure access to public procurement as in the telecommunications sector). The second takes the form of subcontracting of certain labour-intensive activities. The third aims at acquiring already established, know-how-intensive enterprises in order to quicken their own catching-up process in technological fields (Vaitsos, 1990).

Early econometric studies, however, could at best find a weak relationship between IPRs, trade and worldwide distribution of FDI (Ferrantino, 1993). More recent work, on the other hand, reached results suggesting that both the volume and technological level of US direct investment vary indirectly with weak IPRs (Lee and Mansfield, 1996).

## **6. CONCLUSION**

The importance of technological innovation in the creation of competitiveness, the ascending commercial value of the intangible component of technology, and the increasing possibilities of diffusion associated with new technologies have given rise to concern for the protection of intellectual property.

The TRIPs Agreement is, in essence, an outcome of this deepening concern. The Agreement negotiated in the GATT Uruguay Round widens the scope of IPRs and puts down minimum standards for their protection as well as procedures and remedies for their enforcement. In order to ensure that members comply with these standards, it also establishes a mechanism for consultations and surveillance at the international level.

The newly emerging system of protection for IP has been criticised by the developing countries for strongly re-balancing global policies in favour of the technological leaders of the world. This seems to be obviously true, although the full impact of the TRIPs Agreement will not be felt until 2015.

Proponents of the Agreement argue that the change in global policies regarding IP protection will induce innovative activities both in developed and developing countries and promote the international dissemination of technologies and new goods and services. This

argument, however, has not been supported by sufficient evidence, provided by econometric works and surveys. Developing countries will incur new costs with the application of the stronger regime for IP protection in the form of loyalty payments to foreign companies, increases in prices of goods manufactured under license or imported. Besides, administrative costs arising from the obligation to improve their administrative enforcement frameworks will also have to be paid. These needs require urgent provision of additional multilateral financing.

In the short term, the TRIPs Agreement will reduce the illicit application of know-how through copying, imitation or piracy and hence retard the worldwide diffusion of technology. But it should be remembered that expansion of trade in intellectual property has led to the escalation of trade in counterfeit goods, pirated services, etc. Besides, there is the fact that the free-rider position taken by the developing countries who were increasingly using the public good “technological knowledge” as the cornerstone of their imitation policies and refraining from sharing in R&D costs could not be tolerated indefinitely by the developed countries.

The developing countries, in spite of the stringent limitations imposed by TRIPs Agreement, may still practise reverse engineering and engage in processes aiming at the adaptation of technology as long as their legislation on patenting has a limited coverage. The same is valid especially for less developed countries who are to make use of the 10 year grace period enacting copyright legislation. In line with the Paris and Rome Conventions which allow for the compulsory licensing of copyrights for research and educational purposes and are recognised as universally valid by the TRIPs Agreement, they can make use of exceptions as regards the protection of databases.

A clearer and more stable system of protection for IP can be conceived as a system of international competition rules. The TRIPs Agreement will remove uncertainties related to IPRs protection, contribute to transparency, and provide unequivocal rules for competition. In the long term, developing countries will also benefit from these measures.

The TRIPs Agreement will make it much harder for developing countries to make use of the public good nature of R&D activities and



benefit from the positive externalities offered by those activities. The developed countries, on the other hand, will appropriate to a greater extent the oligopolistic profits generated by the market for technology. The developed countries, which have also been under the increasing pressures of adjustment, will be partly relieved of a burden. Their adjustment costs will decline. Although the TRIPs Agreement promotes pro-competitive strategies, there is a persistent concern over the indulgence of oligopolistic firms in anti-competitive practices that result in a rise in prices and blockages in access to technology.

At the Seattle Ministerial Meeting of the WTO, the developing countries stressed the inequity and imbalances which emerged in the course of implementation of the WTO Agreements, including the TRIPs, and made suggestions for reversing that situation. They stated that, although Articles 7 and 8 of the TRIPs Agreement provided for taking into account the development needs of the developing countries, transferring technologies to them, preventing monopolistic trends, promoting public interest and public health, none of those provisions had been implemented. They also claimed that whereas high IPR protection had been provided to industrial products, no recognition has been given and no compensation provided while granting patents on products developed by using bio-resources or traditional knowledge of developing countries (Dubey, 2000).

Some suggestions that have been made on the implementation of the TRIPs by the developing countries are related to the following issues: (i) Non-extension of patents to life forms, (ii) Full disclosure of the sources of biological material or traditional knowledge, (iii) Benefit sharing mechanism to be set up, (iv) Provision of rights, in the sui generis legislations, to farmers, (v) Additional protection for geographical indications other than wines and spirits, (vi) Alignment of the TRIPs with the Convention on Biodiversity, (vii) Exclusion of essential drugs of WTO from patentability, (viii) The elimination of the artificial distinction between biological and microbiological processes, and (ix) Ensuring the continuation of traditional farming practices, including the right to save, exchange and sell seeds for harvest (Dubey, 2000). The developed countries did not accept those demands and exhibit no inclination to accept them in the near future. On the contrary, they strive for a stronger enforcement of the TRIPs Agreement.

Domination of leading technologies has generally been considered a national asset for a long time. Is it correct to assume that it is still so, in a

world where the development of technology is mostly tied to transnationals which decide on its production and application in line with their corporate strategies which is global in character? The strategic alliances between transnationals have played an important role in the failure of research programmes closed to foreign companies in the past. There exists a possibility for similar behaviour to produce somewhat unexpected results that might lead to a more rapid than expected diffusion of technology.

A probable consequence of the TRIPs Agreement in the long run, therefore, seems to be the provision of a greater incentive for developed-country enterprises to invest in developing countries and license patented products to entrepreneurs in those countries.

The TRIPs Agreement can be considered today as part of a policy designed to regulate competition in a defined area between countries, but it may, in the future, provide the basis of a multilateral policy framework utilised in the regulation of competition among firms.

In its present form, however, the TRIPs Agreement does not comply with the principle of 'special and differential treatment' of the developing countries and is highly biased in favour of the monopoly rights of intellectual property owners and puts developing countries under a heavy burden.

## REFERENCES

Agosin, M.R., D.Tussie and G.Crespi (1995), "Developing Countries and The Uruguay Round: An Evaluation And Issues For The Future", in UNCTAD, *International Monetary and Financial Issues for the 1990's*, Vol. VI, UNCTAD Sales No.E.95.II.D.7 New York and Geneva: United Nations.

Aoki, R. and T.J.Prusa (1993), "International Standards of Intellectual Property and R and D Incentives", *Journal of International Economics*, 35, pp.251-273.

Bifani, P. (1990), "The New Mercantilism And The International Appropriation of Technology", in UNCTAD, *Technology, Trade Policy*

*And The Uruguay Round*, (UNCTAD/ITP/23), New York: United Nations.

Coe, D. and E.Helpman (1995), “International R&D Spillovers”, *European Economic Review*, 39, pp.859-887.

Coe, D.T., E. Helpman and A.W. Hoffmeister (1997), “North-South R&D Spillovers”, *The Economic Journal*, 107 (January), pp.134-149.

Dubey, M (2000), *Coping with Globalisation*, paper presented at the Conference on South Asia 2010: Challenges and opportunities, CASAC.

Eaton, J. and S. Kortum (1996), “Trade in ideas, Patenting and productivity in the OECD”, *Journal of International Economics*, 40, pp.251-278.

EC (1997), *Second European Report on Science and Technology Indicators*.

Fisch, G. and B. Speyer (1995), “TRIPs as an Adjustment Mechanism in North-South Trade”, *Intereconomics*, 30(2), pp.65-69.

Ferrantino, M.J. (1993), “The Effects of Intellectual Property Rights on International Trade and Investment”, *Weltwirtschaftliches Archiv*, 129 (2), pp.300-331.

Grossman, G. and E.Helpman (1991), *Innovation and Growth in the Global Economy*, Massachusetts and London: MIT Press.

Helpman, E. (1993), “Innovation, Imitation and Intellectual Property Rights”, *Econometrica*, 61, pp.1247-80.

ITC (International Trade Center) and CS (Commonwealth Secretarial), (1995), *Business Guide To The Uruguay Round*, ITC/226/1/96-111 EID, D/E/GATT/5.

Lee, E.J. and E. Mansfield (1996), “Intellectual Property Protection and US Foreign Direct Investment”, *Review of Economics and Statistics*, 78(2), pp.181-186.

Levin, R.C., A.K. Klevorick, R.R. Nelson, and S.G. Winter (1987), Appropriating the Returns from Industrial and Development, *Brookings Papers on Economic Activity* 3, pp.783-831.

Mansfield, E. (1994), "Intellectual Property Protection Foreign Direct Investment and Technology Transfer", *IFC Discussion Paper*: 19, Washington D.C.

Maskus, K.E. (1998), "The International Regulation of Intellectual Property", *Weltwirtschaftliches Archiv*, 134(2), pp.186-207.

——— (1997), "Implications of Regional and Multilateral Agreements for Intellectual Property Rights", *The World Economy*, 20(5), pp.681-694.

——— (1996), "Intellectual Property Rights in the Global Information Economy", in T.J. Courchene (ed.), *Policy Frameworks for a Knowledge Economy*, Kingston, Ontario: John Deutsch Institute for the Study of Economic Policy,

Maskus K.E. and M. Penubarti (1995), "How trade-related are intellectual property rights?", *Journal of International Economics* 39, pp.227-248.

Naqvi, S.N.H. (1994), "Developing Countries and the Uruguay Round Agreement", *Journal of Cooperation Among Islamic Countries*, 15(1-2), pp.91-112.

Primo Braga, C.A. (1996), "Trade-related Intellectual Property Issues: The Uruguay Round Agreement and Its Economic Implications", in W. Martin and I.A. Winters (eds.), *The Uruguay Round and the Developing Countries*, Cambridge: Cambridge University Press.

Ricupero, R. (1990), "Trade And Technology: Issues At Stake For Developing Countries", in UNCTAD, *Technology, Trade Policy And The Uruguay Round*, (UNCTAD/ITP/23), New York: United Nations.

Taylor (1994), "TRIPs, trade and growth", *International Economic Review*, 35, pp.361-382.

———, S.M. (1993), "TRIPs, Trade and Technology Transfer", *Canadian Journal of Economics*, XXVI (3), pp.624-637.

UNCTAD (1996), *Economic and Legal Implications for the Developing Countries of Implementing the TRIPs Agreement*, Geneva: UNCTAD.

UNCTAD (1994), *Trade and Development Report, 1994*, New York: UN Publication Sales No.E.94.II.D.26.

Vaitsos, C. (1990), "Radical Technological Change And The New World 'Order' In The World Economy", in UNCTAD, *Technology, Trade Policy And The Uruguay Round*, (UNCTAD/ITP/23), New York: UN.

Van Grastek Communications (1990), "TRIPs, US Trade Policy, Developing Countries and The Uruguay Round", in UNCTAD, *Uruguay Round: Further Papers On Selected Issues*, (UNCTAD-ITP-42), New York: United Nations.

Weston, A. (1995), "The Uruguay Round: Unravelling The Implications For The Least Developed Countries", in UNCTAD, *International Monetary and Financial Issues for the 1990's, Vol.VI*, UNCTAD Sales No. E.95.II.D.7., New York and Geneva: United Nations.

Zeeb, M. (1996), "Intellectual Property Protection and the Globalization of the World Economy", *Intereconomics*, January/February, 1996, pp.21-26.

**Annex Table****Leading Exporters in High-Tech Products**

Million ECU

	1980	1985	1990	1993	1994	1995
European Union (EU)						
Total EU	67.089	139.795	125.209	148.182	170.358	193.871
Intra EU	33.363	70.345	72.916	78.465	91.451	105.760
USA	25.389	56.790	72.653	92.635	100.393	100.175
Canada	1.226	3.401	8.011	10.710	12.179	13.864
Japan	13.660	53.933	52.387	72.681	81.232	85.573
S.Korea	1.167	4.247	8.600	13.237	17.023	22.807
Singapore	1.768	6.403	11.785	22.976	33.893	41.008
Malaysia	943	2.958	4.752	11.526	16.120	19.431
China	..	173	..	4.549	6.974	10.003

**Source:** Second European Report on S&T Indicators, 1997.